

SEQ ID NO:1

PAP3 nucleic acid

GAATTCGCGGCCGCGCTCGACCACCGCTGCGCCCTCCTGCGAGGCCGGCTGAACGAGGAAATA
ATTGCTAATAAGGCCTCTGTAGCCATGGCTACTTCTGACGTGAAACCAAAATCAATAAGTCGTG
CCAAGAAATGGTCAGAGGAAATAGAAAATCTGTACAGATTTCAACAAGCAGGATATCGGGATG
AAATTGAATATAAACAAGTGAAACAAGTTGCCATGGTTCGACCGATGGCCAGAGACAGGGTACG
TGAAGAACTTTCAGCGGAGGGACAATACTTTCTTCTACTACAACAAGAGAGGGAGTGC GA
GGACAAGGAGGTCCACAAAGTGAAGGTTTACGTCTACTGACCTTTTCTTTCTTCGGCTTG
GCAATGCTCCTTTAAGAATTGGTTGTTTACATTCTTCCATCGTGTAATGTCAATTTTACAA
AACAAATTCACAATTCTGTCTTTAATTCATGGTGTCTTACACAACATAAACACCCACCTTGA
AACCCAAAAA

SEQ ID NO:2

PAP7 sequence:

GAATTCGCGGCCGCGCTCGACCTAAAGTTGAGTTGTTCACTGTAGTGACCCGTGTGAAGGTAGTT
TTATTTTAAATCAACTTTTCATTGTGCAAACTAGTAAAAGATGGCAAAGCCTTTTCATCCAACCTTA
TGAAGAAAACTGAAGTTCGTGGCACTGCATAAGCAAGTTCTTTTGGGCCCCATATAACCCAGA
CACGTCCCCTGAGGTTGGATTCTTTGATGTGTTGGGGAATGATAGGAGGAGAGAATGGGCAGCT
CTGGGAAACATGTCCAAGGAGGATGCCATGGTAGAGTTTGTGAAGCTTCTAAATAAGTGTGTGTC
CTCTCCTCTCGGCATATGTTGCGTCCACAGAATAGAGAAGGAAGAAGAGAGAAAAGAAGAA
AGGCGGAGGAGGAGCGAAGGCAGCGTGAAAGAGGAAGAACGAGAGCGGCTGCAAAAGGAAGAA
GAGAAGCGGAAGCGAGAGGAGGAAGACCGGCTGAGACGGGAGGAGGAAGAGAGCGCGCGGAT
AGAGGAAGAGAGGCTTCGGCTGGAACAGCAAAAGCAGCAGATAATGGCAGCTTTAAACTCGCA
GACTGCCGTGCAATTCCAGCAGTATGCAGCCCAGCAGTATCCAGGGAACCTACGAACAACAGCA
GATTCTCATCCGCCAGCTGCAGGAGCAGCACTATCAGCAGTATAAACACCAGGCAGAGCAAAAC
CCAACCTGCACAACAACAGGCAGCATTACAGAAACAGCAAGAAGTAGTGATGGCTGGGGCAT
CATTGCCTGCATCATCAAAGGTGAACACAGCTGGAGCAAGTGATACACTGTCAGTTAATGGAC
AGGCCAAAACCCCACTGAAAATTCCGAAAAAGTCTTTGAGCCAGAAGCTGCAGAAGAAGCC
TTGGAAAATGGACCAAAAAGACTCTCTTCCAGTGATTGCAGCTCCATCCATGTGGACAAGACCA
CAAATCAAAGACTTTAAAGAGAAGATTCCGGCAGGATGCAGATTCTGTGATTACAGTACGTGCA
GGAGAAGTCGTACCCGTCCGAGTCCCGACTCATGAGGAAGGATCATACCTATTTTGGGAATTTG
CCACAGACAGTTATGACATTGGGTTTGGGTTTATTTTGAATGGACAGACTCTCCAAATGTCTGC
TGTCAGTGTGCATGTCAGTGAGTCCAGTGACGAGGAGGAGGAGGAAGAATAATGTCACTTG
TGAAGAAAAAGCAAAAAAGAACGCCAACAAGCCTCTGCTGGATGAGATTGTACCTGTGTACCG
GCGGGACTGTACGAGGAAGTATATGCAGGCAGCCACCAGTATCCAGGGAGGGGAGTCTATC
TCCTCAAGTTTGATAATTCCTACTCTCTGTGGAGGTCCAAGTCCGTCTACTACAGAGTCTA
TTATACTAGATAGAGCTGCTGTTCCAAGGTCCGGAGTCCAGGGTTGAGCACAACATGACGT
TTAATTTCTTTT

SEQ ID NO:3

PAP8 nucleic acid

GAATTCGCGGCCGCGCTCGACGCTGGACACAAGCGTGGAGCGAAGAGCCCTTGGAGAGATTCAG
AATGTAGGTGAAGGCTCTTCAACATCACAGGGCACCTGGCAGTCTTCAGAGTCTCACAGTCA
AACCTGGGGGAGCAGACGCGAGAGCGGACCCAGGGAGGAAGGTGTCAGCGTCGGGAGAGGCA
TAACCGAATGGAACGAGATAGGAGGCGCAGAATCCGCATTTGCTGTGATGAGCTGAATCTTTTA
GTTCCATTCTGCAATGCGGAGACAGATAAAGCAACAACCCTTCAGTGGACCACAGCATTCTCTG
AAGTACATTCAAGAAAGACATGGGGACTCTTTAAAAAGGAATTTGAGAGCGTGTGTTTGGCGTA
AAACTGGCAGAAGGCTAAAGCTGACTAGACCCGAATCCCTGGTGACCTGCCCTGCACAGGGCA
GCCTGCAGAGCAGCCCTGCCATGGAGATCAAGTGACTGGACTGACCCAGGACCTGGGAGAGA

ACCGCCGTTTCCTGCGGCATCATGCACATGCCTGCCATCCCCGGAATTCAGCTCTGAATCCT
CTC

SEQ ID NO:4

PAP15 nucleic acid

GAATTCGCGGCCGCGTCGACCTCGGGGGTAACCCCTTGGGATCATTATGATGTCACCTCTTCAAT
CTCTTGAGACCAGTGATTTATGAACTTGACATTTGGTGCCTGGTGTGGGCTTTGGAAAGCAGAG
GCCACCTTTGTCTGTAGAGGATACTGAGCGGCTGGATGGCAGGAATCCAAAGAGAAGCCAGCC
TCTCGTAGTCGCCCTGGGACAGTGGAAGAGAGGGAGGACCGGCAAAGGGGAATCTGTCTTTCT
CCTAGGCCCCGAGCATGTCCCCTGTGGGACATGCTCTGTGACAGCTGAGCCTGCCAGCCTG
CCTTTCTGAAGTTGGGTGTCTCCTGCCCACAACCAAGCCAGCAATCGGTCTGTTTTCCGAC
AACCTCAGAGCCAGACCTCACAAGCCTATTTTGGTGGTTCCCAAATTTCTCTCAGATCTC
CATGTCTATCCCTCCACTCCCTCCAAAAGAGAAAGAAAAGAATTGAGAAAGAA

SEQ ID NO:5

PAP20 nucleic acid

GAATTCGCGGCCGCGTCGACCTCAGAAGAGGAAAAGAGGTGCAGAAGTGCTGGCGGCACAAA
TTGTACAGAAAACCAGACTAGAGAGAAAAAAACAAGAAGCGTCTGTATCTAAAGATGCTCCAG
TGCCTACAAATACTAAAAGGGCAAAGAAAACAAGAGAAGTCTCCAGGTAGAATTGCCTCACAGT
CTAAGCCACCCATGAAAAAGTCTCCACAAAAACGGAAGGTAAATGTAGCAAGAGGCCGTCGG
AATACCAGAAAGCAGCTCCAACCTGCCGAAAAAGAAATTGCTTTACATCTTCAATCAGAAATT
TCATCAGATGGCAAAAAGATGGACTTAACCTAAGTACATCTCAACAAGAAAGTATTTCAATG
ATTCTTAAAGGTCTCTCTGAAAACCTCAGTTATCAGCTGTGACTCCCAGGCCCTAAATATGTTAG
CTGATCTGGCATTAAAGTTCTGCTGCTGCTTCTATACCATCTTGTAAGCCCAGGAACCTTCCCTG
CGTCTCTGATTTGCCACGAAACAATGTCTTACTCACTAAAGAAAATCCATTGCTTGGTGCCT
CTGACCATGAATATCATAAGGG

SEQ ID NO:6

PAP3 amino acid sequence

Met Ala Thr Ser Asp Val Lys Pro Lys Ser Ile Ser Arg Ala Lys
Lys Trp Ser Glu Glu Ile Glu Asn Leu Tyr Arg Phe Gln Gln Ala
Gly Tyr Arg Asp Glu Ile Glu Tyr Lys Gln Val Lys Gln Val Ala
Met Val Asp Arg Trp Pro Glu Thr Gly Tyr Val Lys Lys Leu Gln
Arg Arg Asp Asn Thr Phe Phe Tyr Tyr Asn Lys Glu Arg Glu Cys
Glu Asp Lys Glu Val His Lys Val Lys Val Tyr Val Tyr

SEQ ID NO:7

PAP7 amino acid sequence

Arg Pro Arg Arg Pro Lys Val Glu Leu Phe Thr Val Val Thr Arg
Val Lys Val Val Leu Phe Leu Asn Gln Leu Ser Leu Cys Lys Leu
Val Lys Asp Gly Lys Ala Phe His Pro Thr Tyr Glu Glu Lys Leu
Lys Phe Val Ala Leu His Lys Gln Val Leu Leu Gly Pro Tyr Asn
Pro Asp Thr Ser Pro Glu Val Gly Phe Phe Asp Val Leu Gly Asn
Asp Arg Arg Arg Glu Trp Ala Ala Leu Gly Asn Met Ser Lys Glu
Asp Ala Met Val Glu Phe Val Lys Leu Leu Asn Lys Cys Cys Pro

SEQ ID NO:10

PAP20 amino acid sequence

Asn Ser Arg Pro Arg Arg Pro Gln Lys Arg Lys Arg Gly Ala Glu
Val Leu Ala Ala Gln Ile Val Gln Lys Thr Arg Leu Glu Arg Lys
Lys Gln Glu Ala Ser Val Ser Lys Asp Ala Pro Val Pro Thr Asn
Thr Lys Arg Ala Lys Lys Gln Glu Lys Ser Pro Gly Arg Ile Ala
Ser Gln Ser Lys Pro Pro Met Lys Lys Ser Pro Gln Lys Arg Lys
Val Asn Val Ala Arg Gly Arg Arg Asn Thr Arg Lys Gln Leu Gln
Pro Ala Glu Lys Glu Ile Ala Leu His Leu Gln Ser Glu Ile Ser
Ser Asp Gly Gln Lys Asp Gly Leu Asn Leu Ser Thr Ser Gln Gln
Glu Ser Ile Ser Met Ile Pro Lys Gly Pro Pro Glu Asn Ser Val
Ile Ser Cys Asp Ser Gln Ala Leu Asn Met Leu Ala Asp Leu Ala
Leu Ser Ser Ala Ala Ala Ser Ile Pro Ser Cys Lys Pro Arg Asn
Leu Pro Cys Val Ser Asp Leu Pro Arg Asn Asn Val Leu Leu Thr
Lys Glu Asn Pro Leu Leu Gly Ala Ser Asp His Glu Tyr His Lys
Gly

SEQ ID NO:11

Ser Ser Asp Glu Glu Glu Glu Glu Glu Glu Asn Val Thr Cys Glu
Glu Lys Ala Lys Lys Asn Ala Asn Lys Pro

PAP20: 10529260